FEDERAL-STATE-PRIVATE
COOPERATIVE SNOW SURVEYS

WATER SUPPLY OUTLOOK FOR WESTERN UNITED STATES

Including Columbia River Drainage in Canada

Prepared by

U. S. DEPARTMENT of AGRICULTURE ★ SOIL CONSERVATION SERVICE

Collaborating with
CALIFORNIA DEPARTMENT of WATER RESOURCES
and
BRITISH COLUMBIA DEPARTMENT of
LANDS, FORESTS and WATER RESOURCES

AS OF
APR. 1, 1972

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1900 snow courses in Western United States and in the Columbia Basin in British Columbia. Networks of automatic snow water equivalent and related data sensing devices, along with radio telemetry are expanding and will provide a continuous record of snow water and other parameters of key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

COVER PHOTO NUMBER ORC 221-3

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, Western Regional Technical Service Center, Room 209, 701 N. W. Glisan, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	P. O. Box "F", Palmer, Alaska 99645
Arizona	6029 Federal Building, Phoenix, Arizona 85025
Colorado (N. Mex.)	P. O. Box 17107, Denver, Colorado 80217
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 970, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1218 S. W. Washington St., Portland, Oregon 97205
Utah	4012 Federal Bldg., 125 South State St., Salt Lake City, Utah 84111
Washington	360 U.S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 2440, Casper, Wyoming 82601

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia

USDA-SCS-PORTLAND, OREG. 1970

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ISSUED

APRIL 1, 1972

The Soil Conservation Service coordinates snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Corps of Engineers, Forest Service, National Park Service, NOAA, National Weather Service, Geological Survey, and other Federal Agencies, Departments of State Government, Irrigation Districts, Power Companies, and others.

The Department of Water Resources coordinates snow surveys in California.

The Water Resources Service, Department of Lands, Forests, and Water Resources directs snow surveys in British Columbia.

This report was prepared by the Water Supply Forecasting Unit, Engineering Division, Soil Conservation Service, from data supplied by Snow Survey Supervisors of the Soil Conservation Service in the States of Alaska, Arizona, Colorado and New Mexico, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

Data from California was supplied by the Chief, Water Supply Forecast and Snow Survey Unit, Department of Water Resources.

Data from British Columbia was supplied by the Chief, Hydrology Division, Water Investigations Branch, Department of Lands, Forests and Water Resources.

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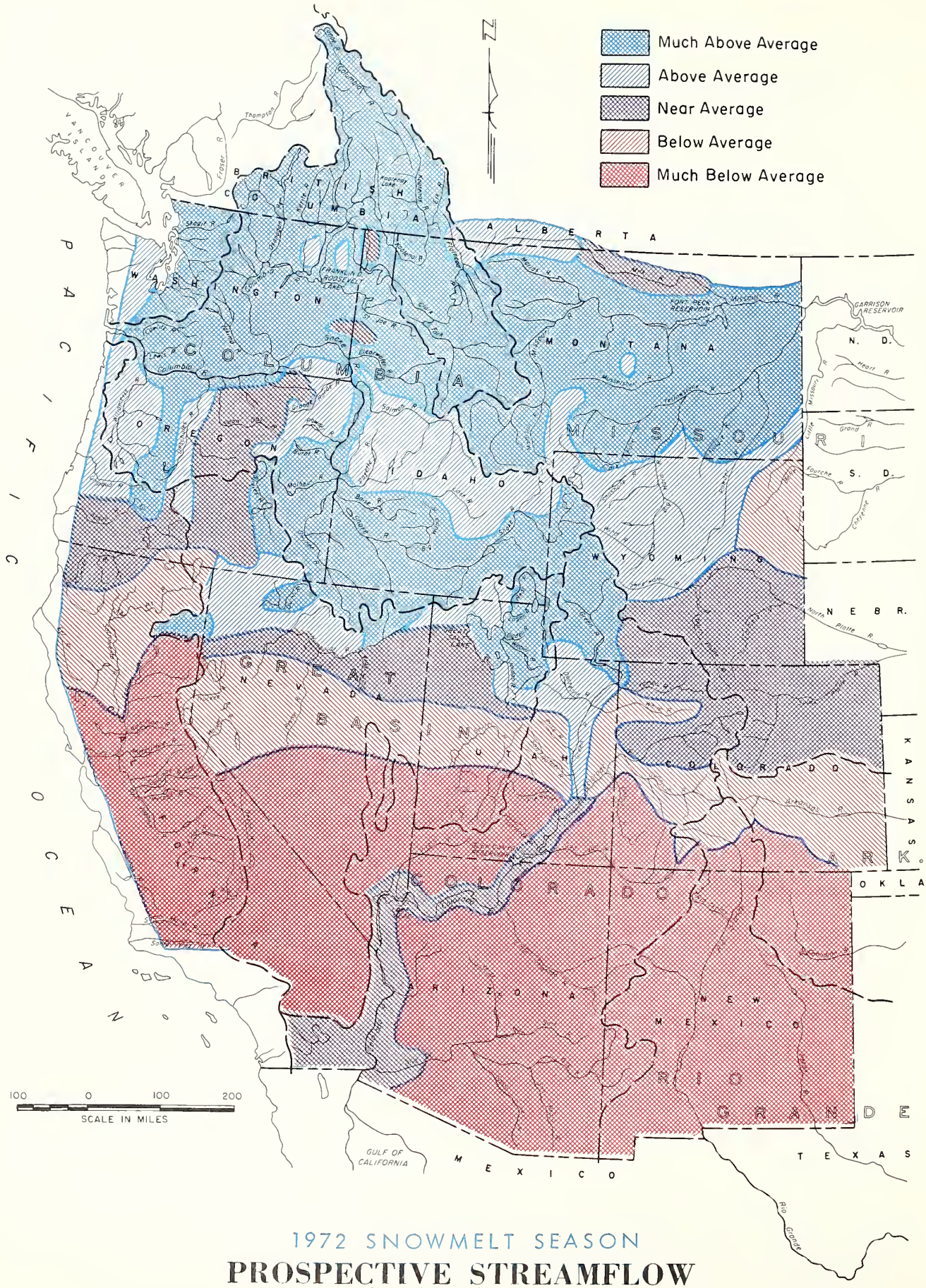
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
KENNETH E. GRANT, ADMINISTRATOR



1972 SNOWMELT SEASON

PROSPECTIVE STREAMFLOW

AS OF APRIL 1, 1972

USDA SCS PORTLAND, OREG. 1971 M7-0-2201-C1-L

WATER SUPPLY OUTLOOK

1972 SNOWMELT SEASON
APRIL 1, 1972

WESTERN SNOWPACKS RANGE FROM NEAR ONE AND A HALF TO OVER TWICE NORMAL AMOUNTS ON MOST MAJOR WATER PRODUCING AREAS OF THE COLUMBIA, UPPER MISSOURI, AND UPPER GREEN RIVER BASINS, DOWN AS LOW AS ZERO TO 30 PERCENT NORMAL ON WATERSHEDS OF ARIZONA, NEW MEXICO AND SOUTHERN CALIFORNIA. GENERALLY EXCELLENT RESERVOIR STORAGE WATER SUPPLEMENTS STREAMFLOW PROSPECTS TO PROVIDE AN ADEQUATE TO EXCELLENT WATER SUPPLY OUTLOOK FOR MOST IRRIGATED AREAS. RESERVOIR SUPPLIES SHORT IN NEW MEXICO. LOCALIZED SHORTAGES EXPECTED IN SOUTHWEST FOR WATER USERS ON NATURAL STREAMFLOW. HIGH WATER POTENTIAL STILL EXISTS ON NUMEROUS STREAMS IN THE HEAVY SNOWPACK AREAS.

Precipitation during March was practically non-existent in southwestern areas, and varied from below to above average across northern sections. However, the exceptionally warm temperatures that prevailed throughout the west during most of March not only prevented a normal snowpack buildup at middle and low elevations, but caused many snow courses to lose much of their snow water. This even happened in areas of above normal precipitation where only the higher elevation snow showed average or greater accumulation.

This excessive, early snowmelt caused heavy, early runoff and left much less to come during spring and summer months. While this early runoff has been beneficial in northern areas where it has reduced flood potentials, it has sharply reduced the prospects for those water users in southern areas who are dependent on natural streamflow.

In the Columbia Basin the snow is particularly heavy along the Upper Columbia River in Canada, on Montana's Flathead and upper Clark Fork rivers, on the Cascade Mountains in Washington and British Columbia, and on Idaho's Clearwater and southern Snake River tributaries. In these areas the snow ranges from about 140 to over 200 percent of average. The British Columbia Water Resources Service, Department of Lands, Forests and Water Resources reports that, with few exceptions, snow courses in the upper and lower Columbia basins in Canada and on the Similkameen River show maximum or near maximum water contents. The same applies to many United States snow courses.

Watersheds in the Columbia Basin where snow is in the 120 to 140 percent range include the Kootenay, lower Columbia in Canada, the lower Clark Fork and Spokane rivers, streams in Oregon's Cascade Mountains, most of Idaho's Snake River tributaries not mentioned above, and the upper Snake River in Wyoming. Most streams in the Basin are expected to produce from 20 to 50 percent above normal amounts.

Although the heavy March runoff reduced prospects of future flooding, the potential remains exceptionally high on many watersheds. The volume forecast for the Columbia River at The Dalles, Oregon is typical of forecasts for many streams in northern areas. The forecast at The Dalles for the April-September period is for 139 million acre-feet. This is the largest volume experienced since 1894. Even with upstream reservoir regulation, a river stage at Vancouver of near 25 feet during late May or early June can reasonably be expected.

In contrast to the above, snow has practically disappeared from most southwestern watersheds. In Arizona snow only remains on north slopes at elevations above 10,000 feet on the San Francisco Peaks, White and Gila mountains. Stream forecasts range from 15 percent on the Little Colorado above Lyman to 36 percent on the Gila near Solomon. However, water supplies in Arizona will be adequate in the major irrigated areas due to adequate reservoir supplies. Shortages will be felt in other areas, except where ground water can be used as a supplement. The Upper Gila Valley will require extensive pumping to meet water demands.

In New Mexico forecasts range from 31 percent on the Mimbres, 61 percent on the Pecos, 67 percent on the Rio Chama, to 70 percent on the Rio Grande at Otowi Bridge. Storage in Elephant Butte Reservoir is 61 percent average, while in El Vado it is 33 percent average.

The California Department of Water Resources reports that runoff forecasts for spring and

SUMMARY OF SNOW WATER EQUIVALENT MEASUREMENTS APRIL 1, 1972

MAJOR BASIN AND SUB — WATERSHED	WATER EQUIVALENT IN PERCENT OF: LAST YEAR	AVERAGE
MISSOURI BASIN		
Jefferson	100	147
Madison	79	117
Gallatin	75	109
Missouri Main Stem	105	144
Yellowstone	86	128
Shoshone	89	124
Wind	78	120
North Platte	68	102
South Platte	83	95
ARKANSAS BASIN		
Arkansas	93	88
Cucharas-Purgatoire	113	38
RIO GRANDE BASIN		
Rio Grande (Colo.)	112	68
Rio Grande (New Mexico)	133	31
Pecos	0	0
COLORADO BASIN		
Green (Wyo.)	98	144
Yampa - White	72	93
Duchesne	95	100
Price	70	73
Upper Colorado	76	95
Gunnison	87	84
San Juan	100	58
Dolores	70	54
Virgin	56	46
Gila	160	5
Salt	0	0
GREAT BASIN		
Bear	81	123
Logan	86	133
Ogden	86	124
Weber	86	103
Provo - Utah Lake	75	75
Jordan	91	109
Sevier	56	55
Walker - Carson	55	60
Tahoe - Truckee	57	78
Humboldt	82	87
Lake Co. (Oregon)	61	85
Harney Basin (Oregon)	94	106
UPPER COLUMBIA BASIN		
Columbia (Canada)	105	140
Kootenai	113	140
Clark Fork	120	143
Bitterroot	127	156
Flathead	111	141
Spokane	110	135
Okanogan-Similkameen	112	163
Methow	110	155
Chelan	114	162
Wenatchee	107	190

MAJOR BASIN AND SUB — WATERSHED	WATER EQUIVALENT IN PERCENT OF: LAST YEAR	AVERAGE
SNAKE BASIN		
Snake above Jackson, Wyo.	92	131
Snake above Hiese, Idaho	91	134
Snake abv. American Falls Res.	85	125
Henry's Fork	80	115
Southern Idaho Tributaries	126	133
Big and Little Wood	65	98
Boise	90	135
Owyhee	134	112
Payette	80	125
Malheur	71	99
Weiser	80	125
Burnt	83	109
Powder	89	119
Salmon	90	130
Grande Ronde	95	126
Clearwater	120	145
LOWER COLUMBIA BASIN		
Yakima	102	207
Umatilla	116	116
John Day	88	104
Deschutes - Crooked	87	123
Hood	82	132
Willamette	83	132
Lewis	70	126
Cowlitz	96	153
PACIFIC COASTAL BASIN		
Puget Sound	94	149
Olympic Peninsula	76	110
Umpqua - Rogue	88	126
Klamath	67	92
Trinity	55	65
CALIFORNIA CENTRAL VALLEY		
Upper Sacramento	70	85
Feather	35	50
Yuba	50	70
American	55	75
Mokelumne	60	70
Stanislaus	60	65
Tuolumne	70	65
Merced	65	60
San Joaquin	61	55
Kings	50	45
Kaweah	35	25
Tule	15	10
Kern	35	25

Data for California Watersheds supplied by Dept. of Water Resources, and for British Columbia Watersheds by Dept. of Lands, Forests and Water Resources.

Average is for 1953-67 *period.* California averages are for the period 1931-70. *Based on Selected Snow Courses determined by Distribution within the Basin, Length of Record and Repetitive Monthly Measurement Schedules.*

summer flows are below normal for most areas of the State. Snowmelt runoff from the Cascade Mountains and Sierra Nevada is forecasted to vary from near minimum of record in the Southern San Joaquin Valley, where extensive agricultural developments exist, to below average in the extreme northern portion of the State. However, reservoir storage is near normal and no critical water shortages are anticipated. Some deficincies can be expected in those localized areas which are without sufficient conservation facilities to meet late season irrigation demands.

In the Missouri Basin in Montana nearly all high elevation snow courses along the Continental Divide, except on the Madison and Gallatin rivers, have water contents which are near, with some above, previously measured maximum readings. Stream forecasts are for near, but a little below, previous record volumes and generally range from 130 to 160 percent.

In Wyoming the well above normal snowpack on watersheds of the Wind and Big Horn rivers, as well as smaller tributaries draining from the Big Horn Mountains, indicates streams will yield about 120 to 145 percent of average. Although streamflow coming from the Black Hills will be below average, reservoir storage is excellent in Belle Fourche.

The North Platte and tributaries has prospects of 90 to 105 percent flows, while tributaries of the South Platte are forecast at about 85 to 90 percent. While the main Arkansas River will flow about 15 percent below normal, flow of its southern tributaries may drop to a fourth or a third or more below normal.

In the Upper Colorado River Basin, the snow cover is 144 percent on the upper Green River in Wyoming, about average or 15 percent below on the Yampa, White, upper Colorado, Gunnison and Duchesne rivers. It decreases even further on southern tributaries, ranging between about 50 to 75 percent on the San Juan, Dolores, Price and San Rafael rivers. Inflow to Lake Powell for the April-July period is now expected to be 90 percent of average.

In the Great Basin water supplies will be excellent along the Humboldt River in Nevada and on northern Utah watersheds from the vicinity of Utah Lake and northward. South of these areas the streamflow prospects steadily diminish, with prospective flows on southern streams expected to range from about 40 to 75 percent average. Anticipated flows from streams originating on the east slope of the Sierra Nevada Mountains range from 67 to 80 percent of normal, dropping to less than this in the Owen's Valley. However, in California's Surprise Valley, streamflow is still expected to be near 75 percent above normal. Reservoir storage is exceptionally good in the Great Basin

Near average snow accumulation in Alaska during March leaves a snowpack which is near normal or above. High flows are still expected from the Chena, Salcha, Susitna, Matanuska, Copper and Tanana rivers, as well as from streams in southeast Alaska.

MISSOURI BASIN

Nearly all high elevation snow courses along the Continental Divide, from the Canadian border down to and including the headwaters of the Jefferson River, have water contents which are near or above previously measured maximum readings. The snow on these watersheds is generally in the range of 140 to 160 percent of usual amounts. It decreases across the headwaters of the Madison and Gallatin rivers to the 110 to 120 percent range. The snow increases again on the upper Yellowstone and Clarks Fork drainages to about 125 to 145 percent. Some of the higher elevation courses here also continue to have record high amounts of snow water, with others near previously measured maximums.

Because of abnormally warm temperatures during March there was considerable snowmelt and runoff from lower elevations throughout the Basin. This early melt and runoff reduced the potential for serious flooding along the main streams. However, on lower elevation watersheds such as those coming from the Black Hills of Wyoming and South Dakota, this early melt has so reduced the snowpack that runoff during the remainder of the spring will be below average.

Forecasts of runoff from Montana streams are for near but a little below previous record volumes to come from the Sun, Marias, St. Mary and streams in the upper Yellowstone Basin. Forecasts for most streams on the Missouri range from about 130 to 160 percent. The Gallatin streams are forecast to have 110 to 120 percent runoff while Yellowstone tributaries above Billings are forecast to flow between 120 and 140 percent. The Big Horn and Lower Yellowstone are forecast at 140 to 150 percent. Highest forecasts percentagewise in Montana are on the Belt and Beaverhead rivers, at 174 and 170 percent, respectively.

To the south in Wyoming the snowpack continues above average on the Clarks Fork, Shoshone, Wind and smaller tributaries to the Big Horn River. Forecasts for these streams, as well as the Tongue, Powder and other streams draining from the Big Horn Mountains, range from about 120 to 145 percent.

Light snowfall on the North Platte River during March, combined with the effects of the early melt due to the abnormally warm temperatures of the month, has brought a further reduction in the prospective streamflow.

SELECTED STREAMFLOW FORECASTS APRIL 1, 1972

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
SASKATCHEWAN				
St. Mary near Babb, Montana 1/	600	122	April-Sept.	
UPPER MISSOURI				
Beaverhead near Grant, Montana 2/	180	170	April-Sept.	297
Big Hole near Melrose, Montana	1,020	148	April-Sept.	
Jefferson at Sappington, Montana	1,486	156	April-Sept.	
Madison near Grayling, Montana 3/	590	137	April-Sept.	686
Gallatin near Gateway, Montana	540	117	April-Sept.	731
Sun at Gibson Dam, Montana 4/	820	136	April-Sept.	746
Belt near Monarch, Montana	190	174	April-Sept.	
Marias near Shelby, Montana 5/	870	144	April-Sept.	602
Missouri near Landusky, Montana 6/	6,700	150	April-Sept.	
near Williston, North Dakota 7/	16,300	148	April-Sept.	
S. Fk. Musselshell above Martinsdale, Montana	66	143	April-Sept.	
Milk at Eastern Crossing, Montana	220	84	April-Sept.	
Yellowstone at Yellowstone Lake Outlet, Wyo.	1,000	120	April-Oct.	1,217
at Corwin Springs, Montana	2,500	133	April-Sept.	2,689
at Miles City, Montana 8/	8,150	139	April-Sept.	
Clarks Fork near Belfry, Montana	840	144	April-Sept.	
Shoshone below Buffalo Bill Res., Wyo. 9/	1,050	129	April-Sept.	1,150
Wind near Dubois, Wyoming	131	132	April-Sept.	144
at Riverton, Wyoming 10/	850	130	April-Sept.	
below Boysen Res., Wyoming 11/	980	130	April-Sept.	
Bull Lake Creek near Lenore, Wyoming	210	118	April-Sept.	248
Little Popo Agie near Lander, Wyoming	55	130	April-Sept.	73
Tensleep near Tensleep, Wyoming	90	122	April-Sept.	88
Medicine Lodge near Hyattville, Wyoming	26	131	April-Sept.	21
Shell Creek near Shell, Wyoming	85	129	April-Sept.	
Big Horn near St. Xavier 8/	2,400	140	April-Sept.	2,415
Tongue near Dayton, Wyoming	130	126	April-Sept.	112
No. Fork Powder near Hazelton, Wyoming	12	130	April-Sept.	10.8
PLATTE				
North Platte at Saratoga, Wyoming	520	94	April-Sept.	
Encampment near Encampment, Wyoming	130	102	April-Sept.	221
Laramie near Glendevey, Wyoming 12/	56	92	April-Sept.	
Big Thompson at Drake, Colorado 13/	90	90	April-Sept.	
Clear at Golden, Colorado 14/	105	88	April-Sept.	
St. Vrain at Lyons, Colorado 15/	60	86	April-Sept.	
Cache La Poudre near Fort Collins, Colorado 16/	195	91	April-Sept.	
ARKANSAS				
Arkansas at Salida, Colorado 17/	260	84	April-Sept.	
Cucharas near LaVeta, Colorado	10	83	April-Sept.	
Purgatoire at Trinidad, Colorado	30	65	April-Sept.	
RIO GRANDE				
Rio Grande near Del Norte, Colorado 18/	330	75	April-Sept.	
at Otowi Bridge, New Mexico 19/	360	70	March-July	
Conejos near Mogote, Colorado 20/	120	66	April-Sept.	
El Vado Res., Inflow, New Mexico	125	67	March-July	
Pecos at Pecos, New Mexico	25	61	March-July	
UPPER COLORADO				
Colorado, Grandby Res. Inflow, Colorado 21/	205	94	April-Sept.	
near Dotsero, Colorado 22/	1,300	95	April-Sept.	
near Cameo, Colorado 23/	2,000	90	April-Sept.	
near Cisco, Utah 24/	2,117	76	April-July	
Lake Powell Inflow, Arizona 25/	5,900	90	April-July	
Roaring Fork at Glenwood Aprings, Colorado 26/	600	87	April-Sept.	
Uncompahgre at Colona, Colorado	90	70	April-Sept.	

Forecasts in Califarnia provided by Department of Water Resaurces.
Average is far 1953–67 periad except Califarnia. Califarnia is camputed far 1916–65 periad.
Forecasts assume average Effective Climate Canditians fram Date Thraugh Snaw Melt Seasan.

Explanatory Notes an Forecasts listed an Inside Back Cover.

SELECTED STREAMFLOW FORECASTS APRIL 1, 1972

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLORADO (continued)				
Gunnison, Blue Mesa Res. Inflow, Colorado 27/	575	75	April-Sept.	
near Grand Junction, Colorado 28/	800	70	April-Sept.	
Dolores at Dolores, Colorado	150	65	April-Sept.	
Green at Warren Bridge, Wyoming	450	139	April-Sept.	452
at Green River, Wyoming 29/	1,410	150	April-Sept.	
Flaming Gorge Res. Inflow, Utah 27/	1,585	150	April-July	1,905
at Green River, Utah 30/	2,975	116	April-July	
North Piney at Mason, Wyoming	55	160	April-Sept.	67
Yampa at Steamboat Springs, Colorado	240	92	April-Sept.	
near Maybell, Colorado	800	94	April-Sept.	
Little Snake near Dixon, Wyoming	260	100	April-Sept.	486
White near Meeker, Colorado	235	80	April-Sept.	
Strawberry at Duchesne, Utah 40/	55	112	April-July	62
Duchesne near Tabiona, Utah 31/	120	128	April-July	
at Randlett, Utah 40/	310	118	April-July	
Lakefork below Moon Lake, Utah 32/	67	102	April-July	
Uinta near Neola, Utah	80	101	April-July	
Whiterocks near Whiterocks, Utah	55	108	April-July	59
Price, Scofield Res. Inflow, Utah 33/	22	69	April-July	34
Cottonwood near Orangeville, Utah 34/	32	74	April-July	
San Juan, Navajo Res. Inflow, New Mexico 27/	390	63	April-July	305
near Bluff, Utah 35/	517	58	April-July	
Animas at Durango, Colorado	300	73	April-Sept.	
LOWER COLORADO				
Virgin near Virgin, Utah	20	53	April-June	
Little Colorado above Lyman, Arizona	0.9	15	April-June	0.6
Gila near Solomon, Arizona	12.5	36	April-May	6.9
Frisco at Clifton, Arizona	5.5	29	April May	4.5
Salt at Intake, Arizona	31	25	April-May	27.1
Tonto above Roosevelt, Arizona	1.2	16	April-May	1.3
Verde above Horseshoe Dam, Arizona	17	34	April-May	21.0
GREAT BASIN				
Bear at Utah-Wyo. State Line	131	123	April-July	
at Harer, Idaho	440	195	April-Sept.	
Smith's Fork near Border, Wyoming	165	153	April-Sept.	198
Thomas Fork near Wyo.-Ida. State Line	54	172	April-Sept.	70
Logan near Logan, Utah 36/	147	148	April-July	203
Ogden, Pine View Res. Inflow, Utah 27/	160	178	April-June	160
Weber near Oakley, Utah	108	116	April-June	
Provo near Hailstone, Utah 37/	123	142	April-July	
Strawberry Res. Inflow, Utah	43	105	April-July	
Utah Lake Net Inflow, Utah	247	127	April-July	241
Big Cottonwood near Salt Lake City, Utah	39	115	April-July	42
Beaver near Beaver, Utah	13	69	April-July	19.4
Sevier near Hatch, Utah	20	61	April-July	
near Gunnison, Utah	23	74	April-July	
So. Fork Humboldt near Elko, Nevada	53	91	April-July	135
Humboldt at Palisades, Nevada	170	110	April-July	462
Truckee at Farad, California 38/	200	78	April-July	380
East Carson near Gardnerville, Nevada	135	77	April-July	204
West Carson at Woodsfords, California	40	78	April-July	63
East Walker near Bridgeport, California 39/	40	67	April-August	76
West Walker near Coleville, California	114	80	April-July	150
Donner und Blitzen near Frenchglen, Oregon	74	148	April-July	
Silvies near Burns, Oregon	105	130	April-July	128
Chewaucan near Paisley, Oregon	73	92	April-July	155
Deep above Adel, Oregon	77	121	April-July	131
Bidwell near Ft. Bidwell, California	19.5	169	April-July	

Forecasts in California provided by Department of Water Resources.
Average is for 1953–67 period except California. California is computed for 1916–65 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.

Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS APRIL 1, 1972

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLUMBIA				
Columbia above Steamboat Rapids, B. C.	21,700	119	April-Sept.	18,580
at Birchbank, British Columbia 40/	56,410	122	April-Sept.	48,680
at Grand Coulee, Washington 40/	90,000	130	April-Sept.	75,360
Kootenai at Libby, Montana	10,300	128	April-Sept.	8,966
at Leonia, Idaho	12,000	131	April-Sept.	10,484
Blackfoot near Bonner, Montana	1,510	150	April-Sept.	1,283
So. Fk. Flathead nr Columbia Falls, Montana 40/	3,150	134	April-Sept.	2,816
Flathead at Columbia Falls, Montana 40/	8,400	130	April-Sept.	7,498
near Polson, Montana 40/	10,200	132	April-Sept.	9,382
Clark Fork above Missoula, Montana	2,680	152	April-Sept.	1,980
near Plains, Montana 40/	18,000	145	April-Sept.	15,439
at Whitehorse Rapids, Idaho	20,000	143	April-Sept.	
Bitterroot near Darby, Montana	850	152	April-Sept.	780
Priest near Priest River, Idaho 41/	885	97	April-July	
Pend Oreille below Box Canyon, Washington	22,600	141	April-Sept.	
Kettle near Laurier, Washington	2,150	112	April-Sept.	2,240
Spokane at Post Falls, Idaho 42/	4,500	143	April-Sept.	3,907
Similkameen near Nighthawk, Washington	2,290	150	April-Sept.	1,924
Okanogan near Tonasket, Washington	2,610	150	April-Sept.	2,236
Methow near Pateros, Washington	1,600	152	April-Sept.	
Stehekin at Stehekin, Washington	1,380	152	April-Sept.	
Chelan at Chelan, Washington 43/	1,890	149	April-Sept.	
Wenatchee at Peshastin, Washington	2,780	153	April-Sept.	
SNAKE				
Snake above Palisades Res., Wyoming 44/	3,550	139	April-Sept.	4,048
near Heise, Idaho 45/	5,000	134	April-Sept.	6,267
near Blackfoot, Idaho 46/	5,150	133	April-July	
at Weiser, Idaho	9,000	143	April-Sept.	
Grey's above Palisade, Wyoming	525	145	April-Sept.	634
Salt above Palisade, Wyoming	465	145	April-Sept.	700
Henry's Fork near Ashton, Idaho 47/	685	112	April-Sept.	
Teton near St. Anthony, Idaho	480	122	April-Sept.	
Blackfoot Reservoir Inflow, Idaho	145	142	April-Sept.	
Big Lost near MacKay, Idaho 48/	190	113	April-Sept.	
Portneuf at Topaz, Idaho	105	132	March-Sept.	
Salmon Falls Creek nr San Jacinto, Idaho	125	179	March-Sept.	
Big Wood, Inflow to Magic Res., Idaho 49/	375	143	April-Sept.	616
Bruneau near Hot Springs, Idaho	300	157	March-Sept.	
Boise near Boise, Idaho 50/	2,300	148	April-Sept.	2,610
Jordan near Jordan Valley, Oregon	129	154	April-July	
Owyhee near Owyhee, Nevada 51/	80	133	April-July	124
Owyhee Res. Net Inflow, Oregon 27/	394	140	April-July	478
Malheur near Drewsey, Oregon	112	158	April-July	119
Payette near Horseshoe Bend, Idaho 52/	2,375	129	April-Sept.	2,891
Weiser above Crane Creek, Idaho 40/	630	125	March-Sept.	
Burnt near Hereford, Oregon 40/	45	132	April-July	
Powder near Sumpter, Oregon	64	118	April-July	
Eagle above Skull Creek, Oregon	220	131	April-July	
Imnaha at Imnaha, Idaho	321	104	April-Sept.	443
Salmon at Whitebird, Idaho	8,800	128	April-Sept.	10,398
Lostine near Lostine, Oregon	142	114	April-Sept.	156
Grande Ronde at LaGrande, Oregon	190	110	April-July	187
Clearwater at Spalding, Idaho	12,000	140	April-Sept.	10,707
LOWER COLUMBIA				
Yakima at CleElum, Washington 53/	1,480	153	April-Sept.	
near Parker, Washington 54/	2,870	165	April-Sept.	
Naches near Naches, Washington 55/	1,440	160	April-Sept.	
Walla Walla, So. Fk. near Milton, Oregon	60	111	April-July	69

Forecasts in California provided by Department of Water Resources.
Average is for 1953-67 period except California. California is computed for 1916-65 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.

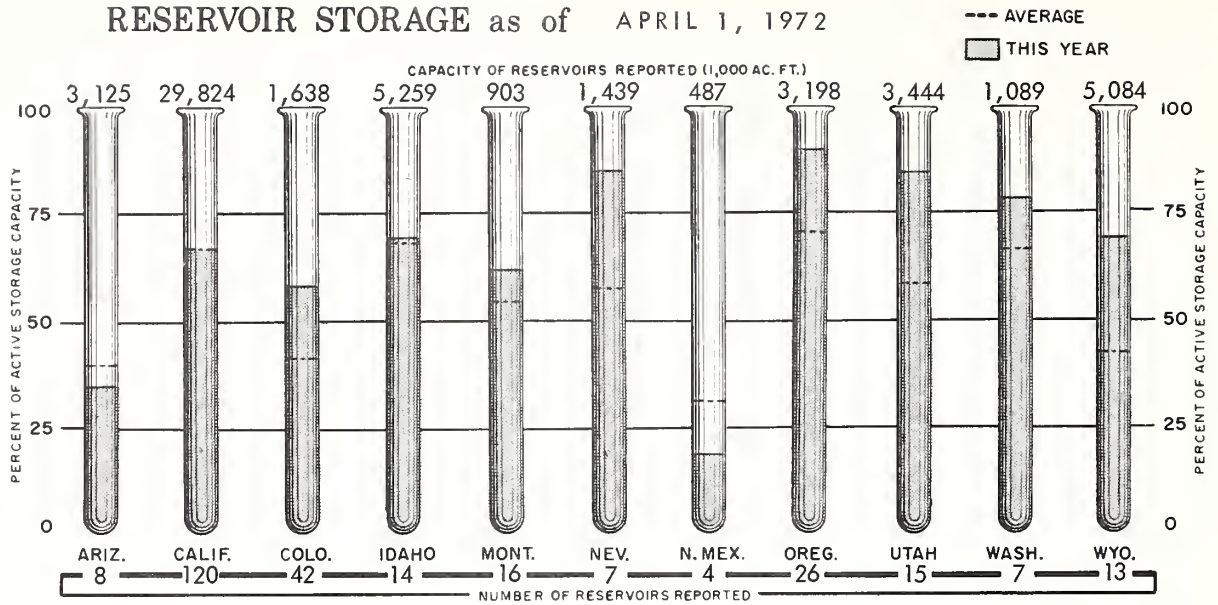
Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS APRIL 1, 1972

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
LOWER COLUMBIA (continued)				
Umatilla at Pendleton, Oregon	150	100	April-July	140
John Day, Middle Fork at Ritter, Oregon	112	100	April-July	136
North Fork at Monument, Oregon	613	108	April-July	
Crooked near Post, Oregon	103	104	April-July	
Deschutes at Benham Falls, Oregon 40/	146	117	April-July	
Columbia at The Dalles, Oregon 40/	139,000	132	April-Sept.	123,427
Hood near Tucker Bridge, Oregon 40/	327	116	April-July	
McKenzie near Vida, Oregon	1,248	115	April-July	
Santiam, South, at Waterloo, Oregon	679	114	April-July	
North, at Mehama, Oregon 40/	929	116	April-July	
Clackamas at Estacada, Oregon	738	107	April-July	977
Willamette at Salem, Oregon 40/	5,659	120	April-July	
Lewis at Ariel, Washington 57/	1,890	139	April-Sept.	
Cowlitz at Castle Rock, Washington 57/	3,750	133	April-Sept.	
NORTH PACIFIC COASTAL				
Dungeness near Sequim, Washington	187	109	April-Sept.	
Umpqua, No., near Tokatee Falls, Oregon 40/	197	112	April-Sept.	
Rogue at Raygold, Oregon	748	96	April-July	
Klamath Lake, Net Inflow, Oregon	520	102	April-July	
Trinity at Lewiston, California	450	73	April-July	734
CALIFORNIA CENTRAL VALLEY 40/				
Sacramento, Inflow to Shasta, California	1,500	85	April-July	2,332
Feather near Oroville, California	1,000	54	April-July	2,701
Yuba at Smartville, California	630	58	April-July	1,387
American, Inflow to Folsom Res., Calif.	720	55	April-July	1,445
Cosumnes at Michigan Bar, California	55	38	April-July	123
Mokelumne, Inflow to Pardee Res., Calif.	285	61	April-July	490
Stanislaus, Inflow to Melones Res., Calif.	395	55	April-July	664
Tuolumne, Inflow to Don Pedro Res., Calif.	650	54	April-July	1,058
Merced, Inflow to Exchequer Res., Calif.	290	48	April-July	502
San Joaquin, Inflow to Millerton Lake, Calif.	575	48	April-July	970
Kings, Inflow to Pine Flat Res., California	500	43	April-July	820
Kaweah, Inflow to Terminus Res., California	80	29	April-July	196
Tule, Inflow to Success Res., California	12	20	April-July	37
Kern, Inflow to Isabella Res., California	95	23	April-July	230
ALASKA				
Chena at Fairbanks, Alaska	725	164	May-June	
Salcha near Salchaket, Alaska	850	145	May-June	

Forecasts in California provided by Department of Water Resources.
Average is for 1953–67 period except California. California is computed for 1916–65 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.

Explanatory Notes on Forecasts listed on Inside Back Cover.



Prospective streamflow now ranges from 88 percent for the North Platte near Northgate to 129 percent for the Little Laramie near Fillmore. Forecasts for most streams range from 90 to 105 percent.

Forecasts are also down on the South Platte River and its tributaries, but are still near average. They range from 86 to 92 percent.

Reservoir storage is excellent throughout the Missouri Basin. This, combined with prospective streamflow provides good to excellent water supply prospects for the summer. If the spring and early summer months are dry, some limited shortages may develop for water users on natural flow rights who are served by streams draining from the Black Hills. However, reservoir storage here is good, as illustrated by Belle Fourche which holds 164 percent of its usual amount.

ARKANSAS BASIN

The dry, warm weather of February continued thru March, reducing the favorable early season snow conditions until now the snowpack varies from about 12 percent below normal on the main, upper Arkansas watershed to over 60 percent below average on the Purgatoire and Canadian rivers.

If the present dry trend is broken so that near average spring rains occur, the Arkansas River at Salida is expected to yield about 84 percent of its normal flow. Outlook for the Cucharas is similar (at 83 percent), but poorer on the Purgatoire which is forecast at only 65 percent. Flow of the Canadian is also expected to be near a fourth to a third below normal.

Combined storage in John Martin and Turquoise reservoirs on the Arkansas River is 87 percent of average. In New Mexico on the Canadian River, storage in Conchas Reservoir is 48 percent.

A continuation of the present trend would reduce the above streamflow prospects considerably, and could cause serious water shortages, particularly for water users on southern tributaries who are dependent on natural streamflow.

RIO GRANDE BASIN

Unless the spring months produce much above normal precipitation, the Rio Grande Basin will experience water shortages this summer. If the dry trend of recent months continues, shortages will become severe for many water users who are dependent on natural streamflow.

The present snowpack is 68 percent of average on headwaters of the Rio Grande in Colorado. It drops sharply to only 31 percent on the New Mexico tributaries and has disappeared from snow courses on the Pecos River. The low snowfall and very warm temperatures of the past two months, which caused the snowpack to ripen unseasonably early with excessive snowmelt, has resulted in streamflow forecasts being lowered 20 to 30 percent below amounts anticipated a month ago.

Valley soils are dry. Due to the heavy, early melting of snow, mountain soils are wet

STORAGE IN LARGE RESERVOIRS APRIL 1, 1972

BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE
UPPER MISSOURI			
Belle Fourche	185	158	164
Boysen	550	410	111
Buffalo Bill	373	179	139
Canyon Ferry	2,043	1,614	104
Fort Peck	19,410	16,590	150
Garrison	24,790	21,816	200
Hebgen	377	254	144
Keyhole	192	170	442
Lake Francis Case	5,816	4,323	114
Lake Sharp	1,900	1,750	405
Oahe	23,630	19,710	156
Tiber	1,347	503	78
Big Horn	1,356	926	129
PLATTE			
City of Denver (5)	507	434	112
Colo-Big Thompson (3)	718	546	130
Glendo	784	443	127
Pathfinder	1,016	915	216
Seminoe	1,010	590	207
ARKANSAS			
Conchas	273	78	48
John Martin	354	25	28
RIO GRANDE			
Elephant Butte	2,195	204	61
El Vado	195	2	33
UPPER COLORADO			
Blue Mesa	830	320	---
Flaming Gorge	3,749	2,637	---
Navajo	1,696	838	---
Powell	25,002	13,424	---
Starvation	152	120	---
LOWER COLORADO			
Havasu	619	568	102
Mead	26,159	17,174	107
Mohave	1,810	1,686	99
Salt River Res. (4)	1,755	935	93
San Carlos	985	100	85
Verde River Res. (2)	318	60	46
GREAT BASIN			
Bear	1,421	1,127	126
Lahontan	314	287	132
Rye Patch	179	188	223
Sevier Bridge	236	186	194
Strawberry	274	206	167
Tahoe	732	552	128
Utah	884	841	140
Willard Bay	193	173	---

BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE
UPPER COLUMBIA			
Chelan	676	200	118
Coeur d'Alene	225	342	221
Duncan	1,347	50	---
Flathead	1,791	1,034	138
Hungry Horse	3,428	1,495	72
Kootenay	673	281	170
Lower Arrow	3,083	153	39
Noxon Rapids	335	175	93
Pend Oreille	1,155	543	128
Roosevelt	5,232	1,242	53
Upper Arrow	4,061	49	6
LOWER COLUMBIA			
Cougar	155	96	---
Detroit	300	197	116
Green Peter	270	173	---
Hills Creek	200	138	115
Lookout Point	337	238	121
Prineville	153	137	118
Wickiup	200	196	101
Yakima Res. (5)	1,066	824	115
SNAKE			
American Falls	1,700	1,544	96
Anderson Ranch	423	282	133
Arrowrock	287	224	95
Brownlee	980	258	---
Cascade	653	228	84
Jackson	847	588	137
Lucky Peak	278	45	37
Owyhee	715	696	146
Palisades	1,200	643	88
Warm Springs	191	166	142
PACIFIC COASTAL			
Clair Engle	2,448	2,303	109
Clear Lake	440	411	205
Nacimiento	350	73	35
Ross	1,203	833	116
Upper Klamath	584	487	104
CALIFORNIA CENTRAL VALLEY			
Almanor	1,036	711	98
Berryessa	1,602	1,388	89
Folsom	1,010	593	122
Isabella	570	117	67
McClure	1,026	560	96
Millerton	521	298	89
Bullards Bar	930	615	109
Oroville	3,484	3,207	120
Pine Flat	1,013	430	71
Shasta	4,500	4,076	106

Reservoir Storage Data Provided by Bureau of Reclamation , Corps of Engineers, Geological Survey. and water using organizations. Data from California and British Columbia provided by Department of Water Resources and Department of Lands, Forests and Water Resources, respectively.

and could produce good runoff from future storms if they were to occur in the near future before all the snow disappears and soils dry out.

Flow of the Rio Grande near Del Norte, Colorado is expected to be about three-fourths of the usual amount. Inflow to the river system is to be about two-thirds of average from the Conejos and Chama rivers. Surface water supplies for the Pecos River are expected to be slightly less. It is forecast to be 61 percent average at the stream gage at Pecos.

The effect of last year's low runoff is reflected in this year's poor carryover reservoir storage. Storage in Elephant Butte Reservoir is 61 percent average, and 33 percent in El Vado. It is also poor on the Pecos River.

COLORADO BASIN

The present snow cover is near, but a little below average, in the Upper Colorado Basin when considered as a whole. As usual it shows considerable variation within the Basin. Tributaries to the Green River in Wyoming have the heaviest snow cover. Here, the snow is essentially the same as last year and is now 144 percent of the usual amount. From here it decreases to about average to 15 percent less than average on the Yampa, White, upper Colorado, Gunnison and Duchesne rivers. It decreases even further on southern tributaries, ranging between about 50 to 75 percent on the San Juan, Dolores, Price and San Rafael rivers.

Snow cover for the entire upper Colorado Basin is 5 percent less than the normal amount.

Because of heavy snowmelt and runoff during March as a result of the abnormally warm temperatures, soil moisture conditions are well above average on most watersheds. The early runoff and dry weather has caused streamflow forecasts to be sharply lowered, particularly for the southern watersheds. Streamflow forecasts for the southern watersheds range from about 60 to 75 percent, while Green River tributaries in Wyoming and northern Utah should contribute near 130 to 160 percent.

The heavy snows on the upper Green River are expected to yield an April-July inflow to Flaming Gorge Reservoir of 1,585,000 acre-feet, or 150 percent of the average amount. Since contributions from the Yampa, White and Duchesne rivers will be considerably lower percentagewise, flow of the Green River at Green River, Utah is expected to be 116 percent average. Forecast for the Colorado near Cisco, Utah is 76 percent, while the forecast for the San Juan near Bluff, Utah is only 58 percent. Combining the above forecasts indicates an April-July inflow to Lake Powell of 5,900,000 acre-feet, or 90 percent average.

In the lower Colorado Basin the Virgin River is now expected to yield only 53 percent of the average flow for the April-June period. This represents a sharp drop from last month's forecast and reflects the fact that snow courses, instead of making their normal gains during March, lost as much as ten inches of water.

In Arizona spring runoff will be much below normal. However, with near normal water supplies in storage, shortages will be confined to areas depending upon direct river diversions.

With no significant precipitation for three months, this is by far the driest January-March period on record. Even with the good storms of December, precipitation since November 1 has been only 38 percent on the Verde, 50 percent on the Salt, and 60 percent on the Gila watersheds. The probability of receiving good precipitation to change this picture is practically gone, since the normal spring dry season generally extends from mid-April to June.

Snow only remains on north slopes at elevations above 10,000 feet on the San Francisco Peaks, White and Gila mountains.

March streamflow of the Verde River was the lowest since 1904. The Salt and Gila were also below average, but not as low as last year. Runoff forecasts for the April-May period range from 27 percent of average for the combined Salt River Project streams to 36 percent on the Gila.

While water supplies will be adequate this year in all areas served by storage facilities, reservoirs will be below last year by the end of the season. The Upper Gila Valley will again be short of water with extensive pumping required to meet water demands.

GREAT BASIN

A second month of very warm, dry weather throughout most of the Great Basin not only prevented a normal snowpack buildup on most watersheds during March, but caused many snow courses -- particularly at low and middle elevations -- to lose much of their water. In southern sections of the Basin the snow water losses ran as high as 10 inches. This excessive, early snowmelt caused heavy, early runoff and left much less to come during spring and summer months.

While the early runoff has been caught in reservoirs and will supply excellent water

supplies for the major irrigated areas of the Basin, it has sharply reduced the prospects for spring and summer water for those water users in southern areas who are dependent on natural streamflow. The drastic effect of the March weather is illustrated by the streamflow forecast for the Sevier River near Hatch, Utah. On March 1st the prospective April-July flow was 127 percent of average, while by April 1st it had dropped to only 61 percent of average.

The snowpack ranges from average to a third above average on the upper Bear, Logan, Ogden, Weber and Jordan rivers in Utah and on Oregon's Harney Basin. It ranges from about 80 to 90 percent of average in Oregon's Lake County and on Nevada's Humboldt River, 70 to 80 percent on the Provo-Utah Lake and Tahoe-Truckee drainages. It falls to 60 percent on the Walker-Carson rivers and 55 percent on the Sevier River.

Forecast flows for Oregon streams range from 92 percent on the Chewaucan near Paisley to 148 percent on Donner und Blitzen near Frenchglen.

Streams in California's Surprise Valley now have prospects of flowing at near 170 to 180 percent. In Nevada the forecast flow of the Humboldt and its tributaries varies from 91 percent for the South Fork Humboldt near Elko to 134 percent for the North Fork Humboldt at Devils Gate. Anticipated flows from streams originating on the east slope of the Sierra Nevada range from 67 to 80 percent of normal, dropping to less than this in the Owen's Valley.

Stream forecasts in southern Utah range between about 40 to 75 percent of average. On northern Utah watersheds, expected streamflow is near average or above from the vicinity of streams draining into Utah Lake, and northward into Idaho and Wyoming. Most forecasts fall in the range of 125 to 180 percent of average, with the highest forecast being 241 percent for Lost Creek near Croyden, Utah.

Some areas in southern sections of the Basin which are without adequate reservoir storage can expect to run short of adequate water by mid-June or early July.

Reservoir storage is excellent. In Nevada it is 146 percent of average, with many reservoirs completely full. Reservoirs in Utah have slightly less, with 141 percent. Storage in the Sevier River reservoirs is excellent and now stands at 179 percent.

COLUMBIA BASIN

Good to excellent water supplies are expected throughout the Columbia Basin this year. However, unless spring weather produces a long drawn out, slow snowmelt season, high water problems could develop on many watersheds as extremely heavy snowpacks melt. An extended period of high temperatures during the main snowmelt period, or a combination of a rainy period coming when high temperatures have ripened the snowpack so it is yielding water heavily, could accentuate problems from peak flows.

The exceptionally warm weather which lasted till near the end of March caused heavy melting of low and some middle elevation snowpacks. As a result, even in areas where the average snowpack for watersheds as a whole is in the range of 120 to 140 percent, there are snow courses at higher elevations which are reporting maximum or near maximum snow water contents. In these areas, streams which produce their major water supply from the higher elevations will flow at near maximum amounts.

The heavy snowmelt of March caused excessive runoff, producing many new records for high streamflow for the month, both in the United States and Canada. While this early runoff has reduced the prospects of future flooding, the potential remains exceptionally high on many watersheds. The volume forecast for the Columbia River at The Dalles, Oregon is typical of the forecasts for many of its tributaries. The forecast at The Dalles for the April-September period is for 139 million acre-feet. This is the largest volume since 1894. Even with upstream reservoir regulation, a river stage at Vancouver of near 25 feet during late May or early June can reasonably be expected.

With the exception of the Priest, Little Wood, Upper Owyhee in Nevada and the Palouse rivers, where the snow is near 5 to 25 percent less than average, the Columbia Basin has a normal to record breaking high snowpack. The snow is particularly heavy, percentagewise, along the Upper Columbia River in Canada, on Montana's Flathead and upper Clark Fork rivers, on the Cascade Mountains in Washington and British Columbia, and on Idaho's Clearwater and southern Snake river tributaries. In these areas the snow ranges from about 140 to over 200 percent of average.

The British Columbia Water Resources Service reports that, with few exceptions, snow courses in the upper and lower Columbia Basin in Canada and on the Similkameen River show maximum or near maximum water contents. The same applies to many United States snow courses in the areas of 140 to 200 percent snow cover.

Watersheds where snow is in the 120 to 140 percent range include the Kootenay, lower Columbia in Canada, the lower Clark Fork and Spokane rivers, streams in Oregon's Cascade

Mountains, Idaho's Salmon, Payette, Weiser, Boise, Bruneau, Teton and Blackfoot rivers, and Wyoming's Snake River and tributaries. Snow is average to 20 percent above average in remaining areas.

Most streams in the Basin are expected to yield flows which will be about 20 to 50 percent above normal amounts. Forecasts for some southern tributaries to the Snake River range as high as about 80 percent above average. In this area, there is a possibility that the Oakley and Salmon Falls reservoirs may fill for the first time on record.

Storage in reservoirs continues well above average except where water has been released early to provide flood storage space where it is required to control anticipated high flows.

ALASKA

Near average snow accumulation during March leaves most areas of Alaska with a snowpack which is near normal or above.

The Matanuska, Susitna and Copper rivers have a snowpack which is well above average, with some snow courses just barely equaling previous record high readings. On the Tanana and Chena rivers the snow is still well above normal, but it is near average on the Yukon drainages.

On coastal drainages the snow is well above normal at low and middle elevations, and 115 percent at the high elevations. In southeast Alaska near Juneau the snow is slightly above any previous readings taken during the previous 7 years. Although records are short on the Kenai Peninsula and on the Koyukuk River, it appears that snow in these areas is near normal.

The above normal snow on the Chena and Salcha rivers is reflected in the forecasts for these streams. The May-June flow of the Chena at Fairbanks is expected to be 164 percent of average, while the Salcha and Salchaket are forecast at 145 percent.

CALIFORNIA

The California Department of Water Resources, coordinating agency for snow surveys and water supply forecasting in California, reports that runoff forecasts, based upon April 1 data, are below normal in all areas of the State, except for that portion along the Oregon border. Seasonal precipitation to date is well below normal and a regime of summer like weather through most of March brought about a substantial reduction in the snow water content for all major snowfed tributaries. The resulting early season snowmelt runoff helped meet preirrigation demands, especially in the San Joaquin Valley. With the State's major reservoirs storing near average supplies at this time, no critical shortages are anticipated. Some late summer season shortages are anticipated in areas where development of conservation storage or ground water basins have not kept pace with growth.

Precipitation for California during March was essentially limited to the northern portion of the State, from a line running through San Francisco Bay to Mono Lake. South of this line, taking in over half the areas of the State, this March was "the" or one of "the" driest of record. Only along the Oregon border was above normal precipitation experienced. During the three-month period, January through March, precipitation totals are the lowest ever recorded for many stations in the Central Valley and Southern California. At the Los Angeles Civic Center, only 0.13 inch was measured during this three-month period. This prolonged dry period has resulted in some concern on the potential of an early fire season. The vagaries of the weather during March was most aptly demonstrated in the temperature extremes. On the average, temperature departures were above normal for March with many new daily maximums established about midmonth - then on the 26th and 27th freezing temperatures were reached north of the Tehachapis. This cold snap established new minimum temperature records throughout the Southern San Joaquin Valley.

The summerlike weather of March resulted in extensive early season snowmelt throughout the State. Percentagewise, loss in water content over the month approximated the depletion normally experienced during April. Measurements indexing the snowpack of the Tule and Kern River Basins show that this year's April 1 snowpack water content to be the lowest since 1930. The April 1 index of snow stored water in the major snow accumulation areas of the State was only 60 percent of average expectancy.

Forecasts of snowmelt runoff reflect the below average precipitation, runoff, and snow water content observed as of April 1 and assume normal precipitation during the forecasted period. Only in the Upper Sacramento River Basin is runoff expected to exceed 80 percent of normal. In the central Sierra, runoff is forecasted to be about 50 percent of average, approximating that of 1959. Snowmelt runoff for southern Sierra streams is forecasted at about one-fourth of average, or about that which occurred in 1961.

During March, the combination of heavy precipitation, early season snowmelt and drought produced 155 percent of average runoff

from California's major streams. While runoff in the North Coastal area during March was 225 percent of normal, to the south runoff from Central Coastal streams averaged only 5 percent of normal. As a result of the early season snowmelt, runoff from tributaries of the Central Valley averaged about 120 percent of normal for the month. For the period October to April, runoff from the State's major streams averaged 95 percent of normal.

Reservoir storage is normal for this date, based upon data from 121 of the State's major reservoirs. Their aggregate storage is about 20,042,000 acre-feet, some 1,267,000 acre-feet less than at this time last year.

EXPLANATION of STREAMFLOW FORECASTS

All flows are observed flows except as adjusted for: 1/ Storage change in Lake Sherburne. 2/ Storage change in Lima and Clark Canyon reservoirs. 3/ Storage change in Hebgen Lake. 4/ Storage change in Gibson Reservoir and measured diversions. 5/ Storage change in Two Medicine, Four Horns, Lake Francis and Swift reservoirs. 6/ Storage change in Canyon Ferry and Tiber reservoirs. 7/ Changes as indicated in (6/), (8/), plus storage change in Fort Peck. 8/ Storage change in Boysen, Buffalo Bill and Yellowtail reservoirs. 9/ Storage change in Buffalo Bill Reservoir plus Heart Mountain diversion. 10/ Storage change in Pilot Butte and Bull Lake reservoirs plus Wyoming canal diversion.

11/ Changes indicated in (10/) plus storage change in Boysen Reservoir. 12/ Plus diversions to Cache LaPoudre. 13/ Plus by-pass to power plants. 14/ Minus diversion thru Gumlick Tunnel. 15/ Storage change in Price Reservoir. 16/ Minus diversions from North Platte, Laramie and Colorado rivers plus measured diversions above station. 17/ Storage change in Clear Creek, Twin Lakes and Turquoise reservoirs minus diversions from Colorado River. 18/ Storage change in Rio Grande, Santa Maria and Continental reservoirs. 19/ Storage change in El Vado and Abiquiu reservoirs. 20/ Storage change in Platoro Reservoir.

21/ Storage change in Grandby Reservoir as furnished by U.S.B.R. plus diversions by Adams Tunnel and Grand River Ditch. 22/ Changes as indicated in (21/) plus diversions thru Roberts, Gumlick and Moffat tunnels and storage change in Dillon, Homestake, Williams Fork, Green Mountain and Willow Creek reservoirs. 23/ Changes indicated in (22/) and (26/). 24/ Storage change in Blue Mesa Reservoir. 25/ Changes indicated in (24/), (30/) and (35/) and storage change in Lake Powell. 26/ Diversions to Arkansas River plus storage change in Ruedi Reservoir. 27/ (Inflow record as computed by U. S. Bureau of Reclamation.) 28/ Storage change in Taylor, Blue Mesa and Morrow Point reservoirs. 29/ Storage change in Fontenelle Reservoir. 30/ Storage change in Flaming Gorge Reservoir.

31/ Plus diversion through Duchesne Tunnel. 32/ Storage change in Moon Lake Reservoir. 33/ Storage change in Scofield Reservoir. 34/ Storage change in Joe's Valley Reservoir. 35/ Storage change in Navajo Reservoir. 36/ Plus U. P. & L. Co. tailrace and Logan, Hyde Park and Smithfield canals. 37/ Minus diversions thru Duchesne Tunnel and Weber-Provo Canal. 38/ Storage change in Lake Tahoe and Boca reservoirs (Forecast by Truckee Basin Committee.) 39/ Storage change in Bridgeport Reservoir. 40/ Corrected for major upstream impairments -- represents simulated natural flow conditions.

41/ Storage change in Priest Lake. 42/ Storage change in Coeur d'Alene Lake and diversions by Spokane Valley Farms Co. and Rathrum Prairie canals. 43/ Storage change in Lake Chelan. 44/ Storage change in Jackson Lake. 45/ Storage change in Jackson Lake and Palisade reservoirs. 46/ Storage change in Jackson Lake, Palisades, Island Park, Henry's Lake, Grassy Lake plus diversions between Heise and Blackfoot. 47/ Storage change in Henry's Lake and Island Park reservoirs. 48/ Storage change in MacKay Reservoir and diversion in Sharp Ditch. 49/ Combined flow Big Wood near Bellevue and Camas Creek near Blaine. 50/ Storage change in Arrowrock, Anderson Ranch and Lucky Peak reservoirs.

51/ Storage change in Wild Horse Reservoir. 52/ Storage change in Cascade and Deadwood reservoirs. 53/ Storage change in Keechelus, Kachess and CleElum reservoirs plus diversion by Kittitas Canal. 54/ Changes indicated in (52/) plus storage change in Bumping and Rimrock Lakes plus diversion by Roza, Union Gap, New Reservation, Old Reservation and Sunrise canals. 55/ Storage change in Bumping and Rimrock lakes and diversions by Tieton, Selah Valley, Wapatox canals and City of Yakima. 56/ Storage change in Merwin, Yale and Swift reservoirs. 57/ Storage change in Mayfield Reservoir.

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